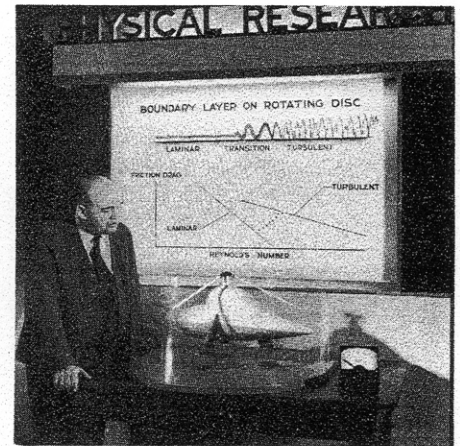


PHYSICAL RESEARCH



Much of the study of fundamental physical phenomena involves purely theoretical analysis. Theoretical study is often sufficient to provide adequate design criteria, but in many cases it serves rather as a guide for experimental investigations.

Because of the abstract nature of some basic physical problems, and the importance of securing generally applicable knowledge about them, the NACA has established a Physical Research Section at the Langley Laboratory to conduct a large amount of the fundamental theoretical work involved in other branches of research. Typical problems attacked in this section are high-speed flutter, propeller flow theory, compressible flow theory, boundary layer mechanics, and helicopter vibration.

In the course of study of basic physics, many original devices and processes have been created. One of these was the first use of Freon 12 in aerodynamic study. The speed of sound in Freon is about half of what it is in air, therefore Mach numbers of 1 and higher can be provided with less power and at lower stream speeds than with air.

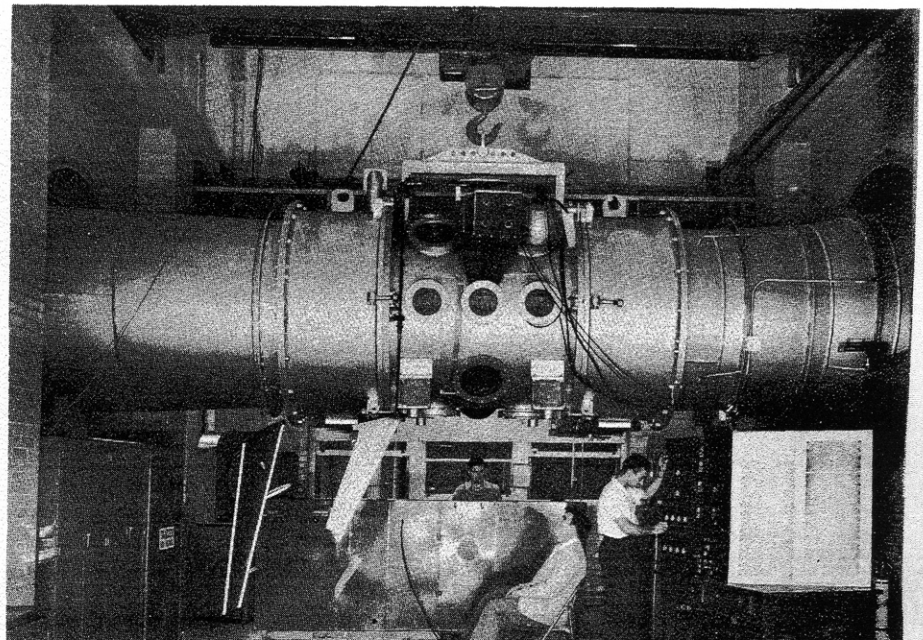
The division has facilities to provide experimental data on certain basic subjects, including a Flutter Wind Tunnel for investigation of aerodynamic flutter at high speeds and a free-flight apparatus for study of reactions of various bodies traveling freely at high speeds.

Free-Flight Apparatus

Tank 100 feet long, 8 foot diameter
Provides information on lift, drag, and stability of bodies propelled from compressed gas gun at velocities between 500 and 1,000 miles per hour
Test Medium: Air, Freon, or mixtures

Flutter Tunnel

Test Section	- - - - -	4 1/2 ft., circular, closed
Speed	- - - - -	M 0 to 0.90
Power	- - - - -	1,000 hp
Pressure	- - - - -	0 to 1.8 atmospheres
Test Medium	- - - - -	Air, Freon, or mixtures



The Flutter Tunnel is one of several pieces of special equipment used for study of basic physical phenomena such as high-speed vibration and flutter of wings.